

REMARKS

Claim Rejections - 35 USC 102

With regard to the rejection of claims 1-8 and 18 under 35 USC 102(b) in view of Payette, *The Virtual Shaft Control Algorithm for Synchronized Motion Control*, it is respectfully submitted that the Examiner has not fully understood the claimed subject matter and as a result the relevancy of the Payette article would appear to be highly relevant in the Examiner's view, although the Payette article in fact describes a very different form of shaft synchronization than what is claimed in this application.

Claim 1 before its most recent amendment recited a synchronization method wherein the elements driven by the drive motors are synchronized in at least one predetermined rotational angle position with the virtual synchronization shaft. The meaning of this language is clear from the discussion in the written description, for example, page 3, third paragraph.

Essentially, this invention proceeds from the concept that the shaft elements need not be synchronized exactly with one another during the entire weaving cycle, but only in certain rotational angle positions when the individual shaft elements must be located in suitable positions.

During the remainder of the weaving cycle, the shafts can assume positions that are largely independent of one another. The individual elements, including the batten, for example, are thus no longer synchronized full time with the main shaft but rather with the virtual synchronization shaft with which the batten is also synchronized, at predetermined angular positions of the virtual shaft.

The individual elements can execute their own motions such that the least possible loads are imposed on their drive motors and/or the elements themselves. The advantages of this system are clear. The start times of the drive motors can be adapted such that they or the elements driven by them need only assume whatever rotational angle position is

desired at the appropriate correct time. Otherwise, the motors may adapt themselves to minimize stress and high loads.

As described in the third paragraph on page 6 of the written description, a regulating and control device (48) establishes a rotational angle course for a virtual synchronization shaft. In the preferred exemplary embodiment, two drive motors (10, 44) are driven as a function of the rotational angle of the virtual synchronization shaft. For example, the control and regulating unit (49) connected to the drive motor (10) regulates this motor in accordance with desired values which are derived from the rotational angle course of the virtual synchronization shaft in such a way that the batten (13) is synchronized, for example, in one angular position ( $0^\circ$  or  $360^\circ$ ) with the virtual synchronization shaft. The drive motor of the batten thus need not be synchronized throughout the full rotational period of the virtual synchronization shaft, but only upon beating up of a weft yarn. During other times, the drive motor 10 may assume a different rotational position with regard to the virtual synchronization shaft and with regard to other drive motors.

Claim 1 has been amended to expand the original language in a manner reflecting the original intended meaning, without changing the substantive scope of the claim. Thus, claim 1 now recites the synchronization procedure as synchronizing the elements driven by the drive motors so that the elements are synchronized with the virtual synchronization shaft at one or more predefined angular positions only, and are permitted to be unsynchronized with one another at positions other than said one or more predetermined angular positions.

Persons skilled in the art will recognize that the amendments to claim 1 do not narrow the scope of the claim but rather expands on the original intended meaning in a manner consistent with the written description (for example, page 3, third paragraph and other portions of the specification) to clarify the intended meaning of the original claim language.

Turning to a rejection of claim 1 by the Examiner, and with particular reference to the Payette article, the article describes the control algorithm referred to as a “virtual shaft” or “relative stiffness” according to which multiple driveshafts may be synchronized more precisely by taking into account the relative stiffness and damping of the various physical shafts as well as other influences on the motion of the different shafts. The objective is to maintain the shafts synchronized to each other as closely as possible taking into account their own dynamic response. The algorithm, in the language of the article “attempts to minimize the tracking error of each axis with respect to the master reference (main shaft) rather than with respect to each other.” Thus, at all times, the shafts are synchronized in various operational modes but they are never permitted to assume their own angular positions relative to the master reference nor are they controlled such that the shafts are synchronized with the master reference at one or more predefined angular position only while they are permitted to be unsynchronized with one another at positions other than said one or more predetermined angular positions.

Payette thus fails as a basis for rejection of claims 1-8 and 18 because it does not provide a teaching of each and every element recited in the claims. Indeed, Payette fails to provide any teaching whatsoever with regard to synchronizing shafts or driven elements with a virtual synchronization shaft at one or more predefined angular positions only while permitting such elements to be unsynchronized with one another and the synchronization shaft at other positions.

Accordingly, withdrawal of the rejection of claims 1-8 and 18 under 35 USC 102(b) based on Payette is appropriate and the same is respectfully requested.

Claims Rejections - 35 USC 103

It is respectfully submitted that the rejection of claims 10, 12-17 and 19 under 35 USC 103(a) as obvious over Payette in view of the applicant’s own description of the background of the invention is improper in view of the comments above with regard to the relevancy of Payette. Payette fails as a basic reference for rejecting the claims as obvious

because it fails to show, teach or suggest the subject matter of the claims. The claims are all dependent from claim 1 and are fully patentable for the same reasons as discussed previously in connection with claim 1 and furthermore are patentable in their own right because they recite a combination of elements that would not be obvious in view of Payette considered with the applicant's description in the background of the invention.

Withdrawal of the rejection of claims 10-12-17 and 19 under 35 USC 103(a) is appropriate and the same respectfully requested.

The foregoing comments also apply with respect to the rejection of claim 11 based on the Payette article, applicant's discussion in the background of the invention and Moessiger U.S. 4, 392,515. Withdrawal of the rejection of claim 11 likewise is appropriate and the same is respectfully requested.

It is respectfully submitted that the applicant is in condition for allowance and its passage to issue is requested.

BACON & THOMAS, PLLC  
625 Slaters Lane, Fourth Floor  
Alexandria, Virginia 22314-1176  
Phone: (703) 683-0500

Date: March 5, 2007

Respectfully submitted,

J. ERNEST KENNEY  
Attorney for Applicant  
Registration No. 19,179